GKN AEROSPACE

# Master Thesis - "CFD validation of LPT-OGV test rig" (30 credits/20 weeks – 1 student)

**About us**

GKN Aerospace is the world's leading multi-technology tier 1 aerospace supplier. With 55 manufacturing locations in 15 countries, we serve over 90% of the world's aircraft and engine manufacturers. We design and manufacture innovative smart aerospace systems and components. Our technologies are used in aircraft ranging from the most used civil aircraft to the world's advanced 5th generation fighter aircraft and the Ariane orbital rockets used by ESA.

**Project Background**

Outlet guide vanes (OGVs) are required to deswirl the flow exiting the low pressure turbine. Using CFD, it is important to predict the flow properties accurately as the pressure and heat transfer losses can be reduced. This thesis involves in validating the CFD methodology of an OGV against experimental data and improve the prediction of heat transfer, i.e as close as to the real engines.

**Assignment Description**

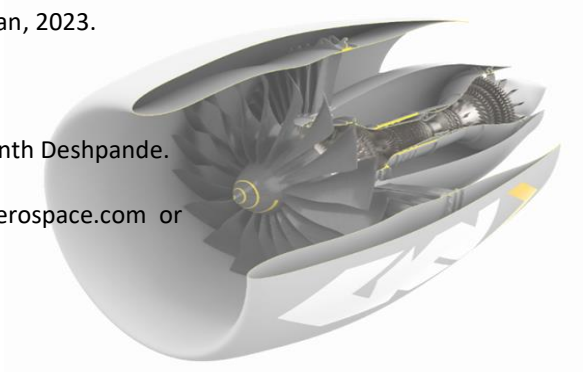
GKN has an experimental database of LPT-OGV rig and would like to build/improve the prediction of heat transfer rate in the OGV. The thesis worker will start with simple 2D test cases initially to understand the heat transfer phenomenon and then proceed with the 3D OGV model. The project milestones and deliverables are described below:

- Project milestones
    1. To perform a CFD validation study for the LPT-OGV test rig using either Ansys Fluent or Ansys CFX.
    2. To build/improve a CFD model to be as close as to a real engine
        i. Like inlcuding purge flow at the hub, improving outer pocket to include tip leakage flow.
        ii. Try out different analyses approaches
            1. Run both 1.5 stage as well as only OGV.
            2. Try out different turbulence models, including transition models maybe transient analysis.
    3. Comparison to standard HTC correlations, which are used in GKN's thermal work and possible suggestions to improve the correlation coefficents.
    4. Study both on-design and off-design condition.
- Deliverables
    1. Validation of the current CFD model against experimental data.
    2. Comparison of validation case and real engine case.
    3. Development of HTC correlation used in thermal analysis work, which captures transition effects.

**Qualifications**

- The thesis student should be in his final year of master studies, preferably from aerospace or aeronautical background with basic knowledge of gas turbines, heat transfer and CFD.
- Should know CFD softwares prederably, Ansys CFX or Fluent
- Coding language: Python or MATLAB

Start date can be decided upon agreement with the supervisor, mostly in Jan, 2023.



**Apply by**

Send your resume and cover letter [additional documents if necessary] to Srikanth Deshpande.

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Last date for application: 2022-11-15.